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ABSTRACT

Parents in affluent communities have been following the suggestion of research and delaying kindergarten entry of their young age-eligible children in order to increase the likelihood of the child's academic success. This study examined the correlation between the chronological age of a child entering kindergarten and his or her performance on reading and math achievement tests in second grade. Gender differences in math and reading performance in second grade were also examined. The subject pool of 24 students was divided into three groups: the younger entrants were between the ages of 4 years 7 months to 4 years 11 months; the medial entrants, ages 5 years to 5 years 4 months; and late entrants, ages between 5 years 5 months to 5 years 7 months. Findings indicated a low or negligible correlation between kindergarten age entry and academic achievement. The younger group did not perform as well as the others in reading, but surpassed the others in math. Girls surpassed boys in both areas. Based on the findings, recommendations were made for informing school personnel about the variable abilities of children in determining age of placement. (JPB)

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The Effects of School Entry Age and Gender on Reading and Math Achievement Scores of Second Grade Students

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Applied Research

The Effects of School Entry Age and Gender on Reading and Math Achievement Scores of Second Grade Students

Introduction

Before the commencement of each school year, parents register their children for kindergarten. Eligibility for enrollment is usually determined by meeting the age requirement based on the cut-off date mandated by the school district or state. Some natural differences should be expected given a twelve-month range of age and ability, regardless of when the cut-off date occurs.

However, in increasing numbers parents in affluent communities have chosen to delay kindergarten entry by a year in hopes of providing an academic advantage for their "young" age-eligible children. Bracey (as cited in Quinlan, 1996) labeled this trend in affluent communities "the graying of the kindergarten." Cameron and Wilson (1989) referred to these children as "red-shirts." Meanwhile, low-income families, working single parents without access to free preschools, are compelled to enroll their age-eligible children without regard to whether they will be younger or older in their classes. The result is that educators are challenged to accommodate a kindergarten population with a widening range of ages, maturational levels, and abilities.

In order to accommodate this diversity plus an increasingly academic curriculum (Shepard & Smith, 1988), transitional programs, prekindergarten and prefirst, have been created to improve success for the developmentally immature children. Gredler (cited in Shepard & Smith, 1988) reviewed eight empirical research that concluded that at-risk children promoted to first grade achieved as well or better than children who spent an extra year in prefirst programs. Research of a prekindergarten program by Buntaine and Costenbader (1997) found no significant differences in academic achievement between ninety matched pairs of children who spent an extra year in prekindergarten, and those who proceeded into regular kindergarten. However, they noted the lack of research conducted on the effectiveness of prekindergarten programs and proposed studies that focus on various geographical areas and socioeconomic groups. O'Brien (1991) concluded that the primary goal in providing for late entry is maturational, not educational.

However the determination of developmental maturity has been controversial. The most popular test, theGSRT, has been found to lack the reliability and validity for placement purposes by four independent testing experts in the Ninth Mental Measurements Yearbook (Shepard & Smith, 1988). The Metropolitan Readiness Test, considered one of the more reliable test, has an error rate of about 30% when used for placement purposes (Shepard & Smith, 1988). According to Wolf and Kessler (as cited in Siegel & Hanson, 1990), no readiness test to date has been shown to provide "long term predictive validity for academic success."

Readiness for programs that have greater academic expectations has caused concern for at-risk children. Curriculum design that fulfills academic goals must meet the developmental needs of children as well. Burts and al. (1993) studied kindergarten classes identified as developmentally appropriate or developmentally inappropriate. The developmentally appropriate program focused on all the areas of the development of the child, while the developmentally inappropriate program focuses primarily on the cognitive area. The findings indicated that low SES children who participated in developmentally inappropriate programs were at the greatest disadvantage academically.

The research on the effect of academic achievement on the kindergarten entrance age has been abundant, but the results are ambiguous. In conducting a review of literature, this author has found that some of the research supported the decision for late entry in promoting academic achievement (Crosser, 1991; Foote, 1991; Parks, 1996). However, a preponderance of corroborating research revealed no significant differences in academic achievement in postponing entrance to kindergarten (Boyd, 1989; Cameron & Wilson, 1990; De Meis & Stearns, 1992; Magliacano, 1994). DeMeis & Stearns (1992) suggests that much of the research that reveal academic difficulties in younger children also conclude that the initial differences related to age diminish or disappear as early as second grade (May & Welch, 1986), third grade (Shepard & Smith, 1985), or fourth grade (Miller & Norris, 1967). Therefore, the conclusion was made that school entrance age does *not* affect academic achievement.

As a teacher of a kindergarten class, the author of this paper has observed firsthand the diversity of abilities, maturational levels, and ages in her class as well as those of her three colleagues. The dilemma of teaching some students the basic skills in kindergarten seem to be an "insurmountable task", the presumption being that some students are "too young" or "not ready" or "not mature enough". Although there were different cut-off dates in the review of research, none of the studies focused on children who were enrolled in a year-round school schedule. Perhaps entering school in July in a year-round program rather than September in a traditional program magnifies the difficulties for an even younger age-eligible student. It is difficult to foresee at the kindergarten level that these children will perform nearly as well or as well as their classmates as early as two or three years later as the review of research purports.

Statement of Problem

There is a tendency for educators to suggest delaying entry for a year to allow young age-eligible children to mature (Elkind, 1987). The assumption is that an older child will have an academic advantage over his younger classmates. However, much of the research reviewed by this author disputes that claim.

Many researchers (DeMeis & Stearns, 1991; Cameron& Wilson,1990; Crosser, 1991; Quinlan,1996) have examined gender differences in their study and the results have been inconclusive.

This applied research will seek to answer the following questions concerning kindergarten entry age and academic achievement.

1. Is there a correlation between the chronological age of a child entering kindergarten and his/her performance on reading and math achievement tests in second grade?
2. Is there a gender difference in academic performance in math and reading in second grade?

Sample

The sample was drawn from Gauer Elementary School in the Anaheim City School District which has a year round schedule that commences in early July (for three tracks) or August (for one track). The Gauer student population of 750 represents a diverse ethnicity. Hispanics comprise 65.7% , Caucasians 18.4%, Asians 8.9%, African Americans 4.6%, Filipino 1.5%, and Pacific Islander 1.5%. Students qualifying for free or reduced lunch comprise 85% of the enrollment. Limited English proficient students make up 57% of the enrollment.

The population selected from the 96 second graders included only 42 students who had been in continuous enrollment since kindergarten at Gauer School. Using the cumulative records of second graders, data were compiled for the birthdate, gender, and national percentile composite reading and math scores on the Terra Nova (Level 12 A, Form T-06) administered in May 1997. The SABE (Spanish) test was administered to 7 students who were not included in this study. In addition 7 more students were excluded because they did not take the test or had completed only one part. One student who was retained was not included in the study. There were no scores for 10 students. A total of 24 students comprised the subject pool.

Limitation

Although it was the intent of the author to examine the achievement scores of fourth graders and thus use the second grade achievement scores to chart growth, there were insufficient numbers to comprise an adequate sample. Only 9 fourth grade subjects met the criteria of continuous enrollment at Gauer and had been tested in second and fourth grade. Consequently, examination of data from second grade was selected for this study.

Crosser (1991) suggested that control for ability should exist in studies. However, ability tests were not administered to the population in this study. The author noted that none of the subjects had been referred for special remedial services such as RSP.

Research Design and Method

This applied research attempted to replicate the design and incorporate the criteria of several studies conducted by Crosser, 1991, Quinlan, 1996, and Magliacano, 1994. The criteria included the following: the use of an objective measure such as standardized

achievement test scores, subjects limited to children who were continuously enrolled in the same school or district, and the exclusion of special education and retained students.

The subject pool of 24 students was divided into three groups: the younger entrants were between the ages of 4 years 7 months to 4 years 11 months (56 months to 59 month); the medial entrants were between the ages of 5 years to 5 years 4 months (60 months to 63 months); and the late entrants were between the ages of 5 years 5 months to 5 years 7 months (64 months to 67 months). The differences between the three groups were about three months, allowing for about an eight-month difference between the younger group and the older group. Computation of the averages and correlation was determined from the data collected from the cumulative records which included the birthdate, age, gender, raw scores and national percentile reading and math composite scores for the TerraNova that was administered in May 1997. Data are listed in Appendix A.

The TerraNova included selected-response test batteries that provided norm-referenced achievement scores. The reading composite scores included reading comprehension, language expression, vocabulary, and word analysis. The math composite scores included math application and computation.

Results

The author was able to find some support that there is a low or negligible correlation between kindergarten entry age and academic achievement. In examining the averages and the standard deviation, there were differences in the performance of the groups. The younger group did not perform as well as the medial and the older group in reading. However, the younger group surpassed the performance of both the medial and older group in math.

The average composite second grade reading and math achievement scores were computed to determine any differences in performance between the groups. Scattergrams illustrated the relationship between the two variables, age and academic performance. Correlation between entry age and reading and math scores determined the strength of the relationship. Averages of male and female students were computed to determine differences in academic performance.

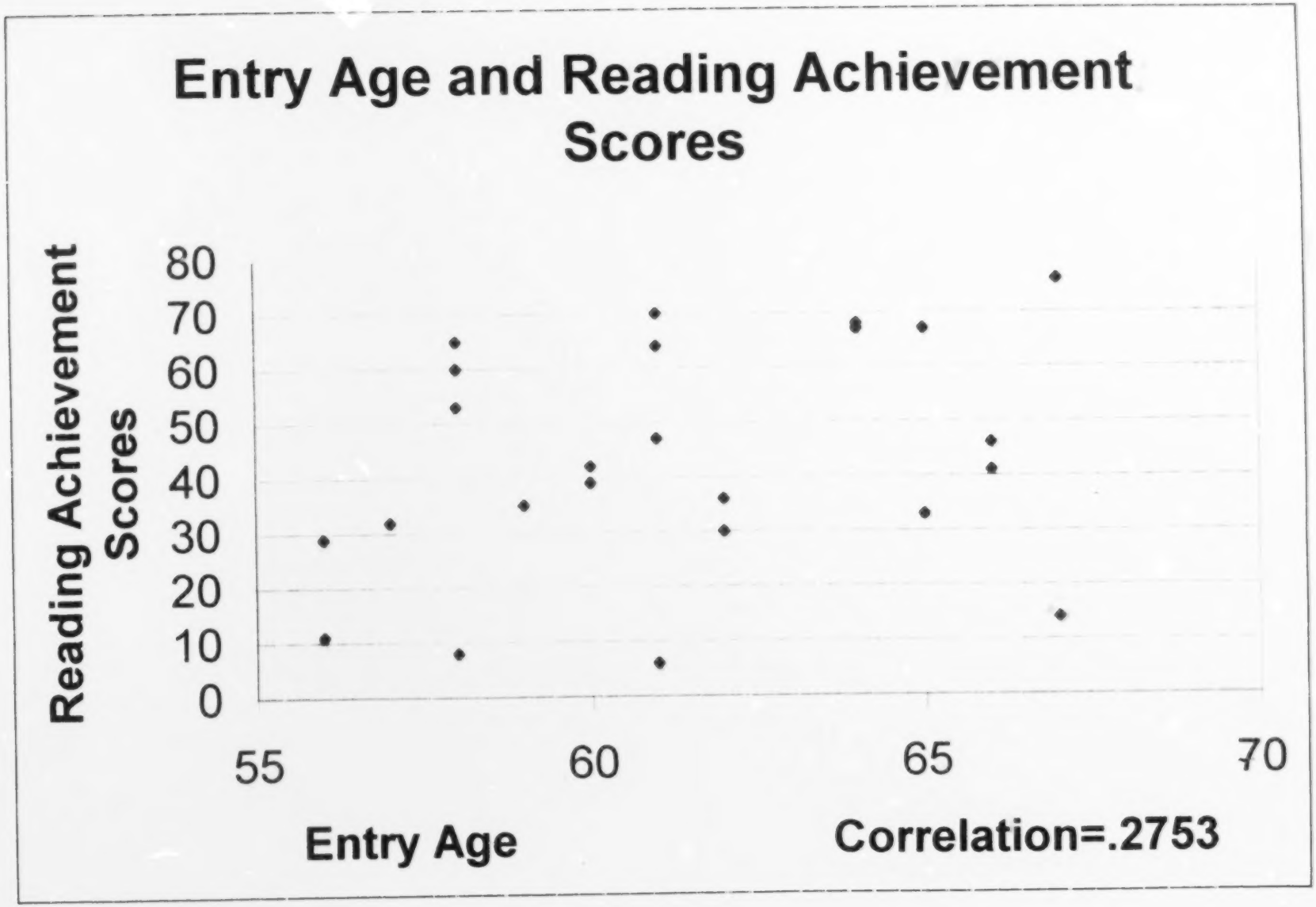
The correlation between entry age and the reading scores showed a correlation of .2753, and the correlation between entry age and math scores showed a correlation of .1071. The correlation for reading and math performance and entry age was found to lack significance.

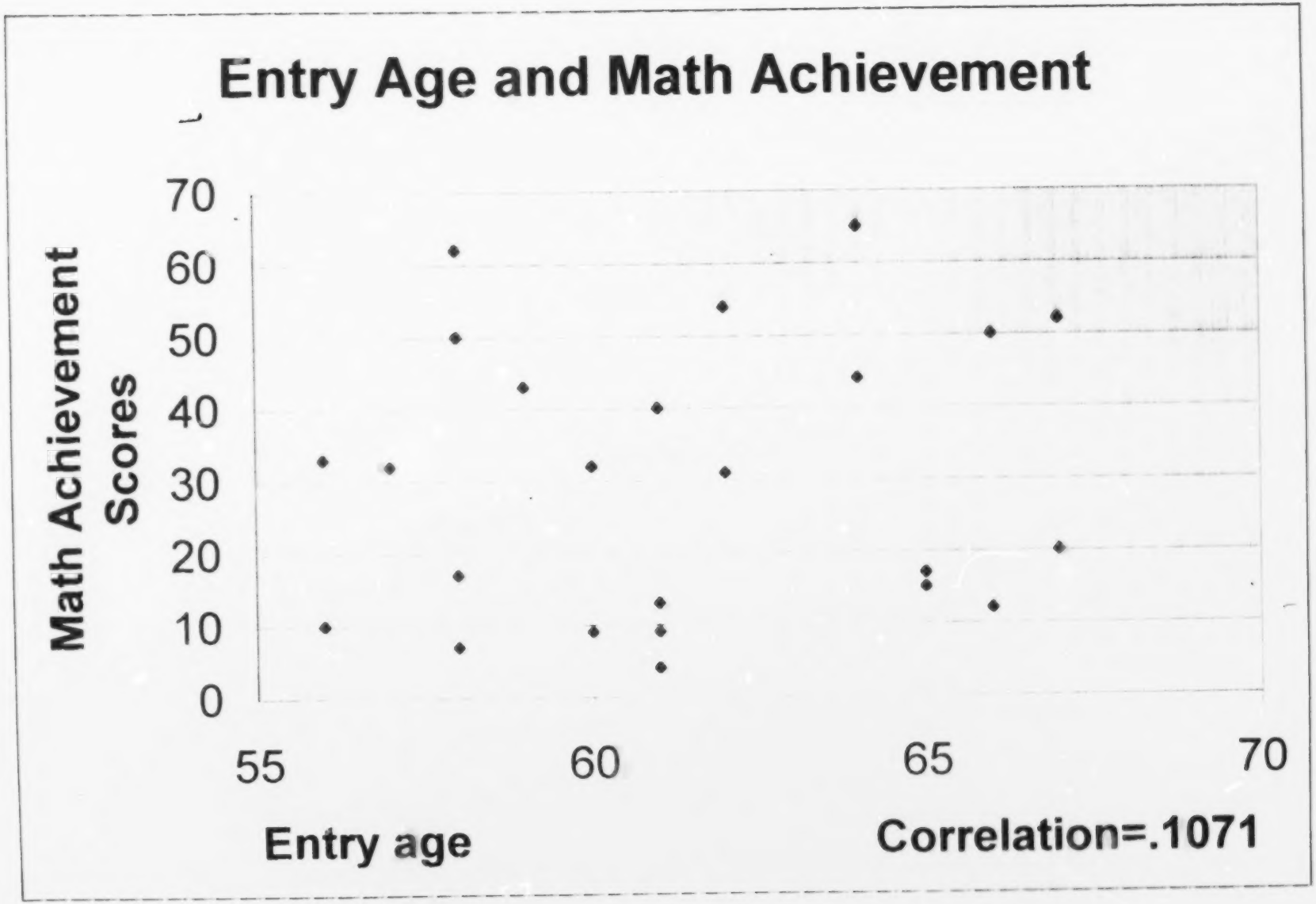
In examining gender averages in the reading and math scores, females surpassed males in both areas supporting the findings of some researchers.

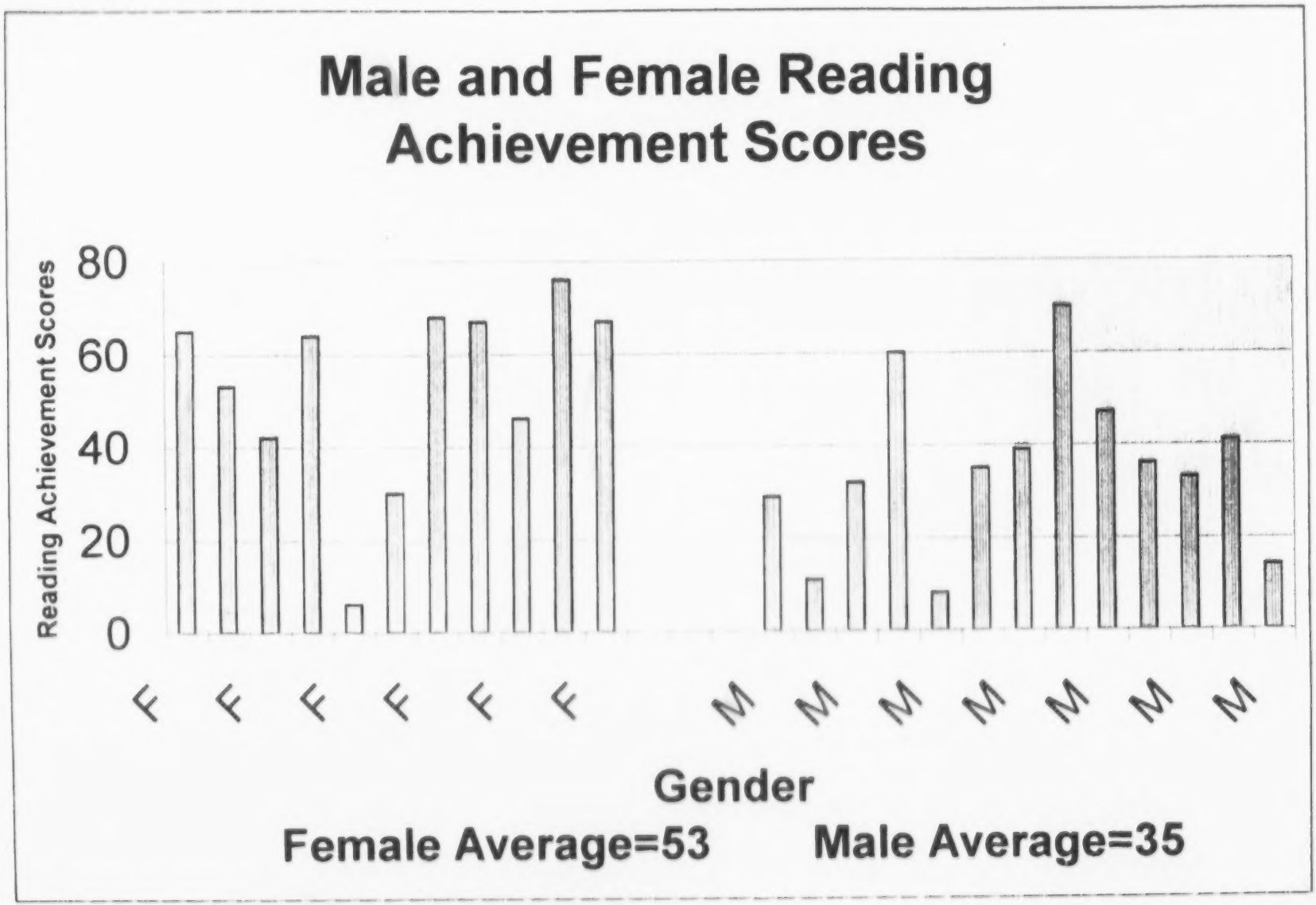
Comparison of Group Averages of Younger, Medial, and Older Groups

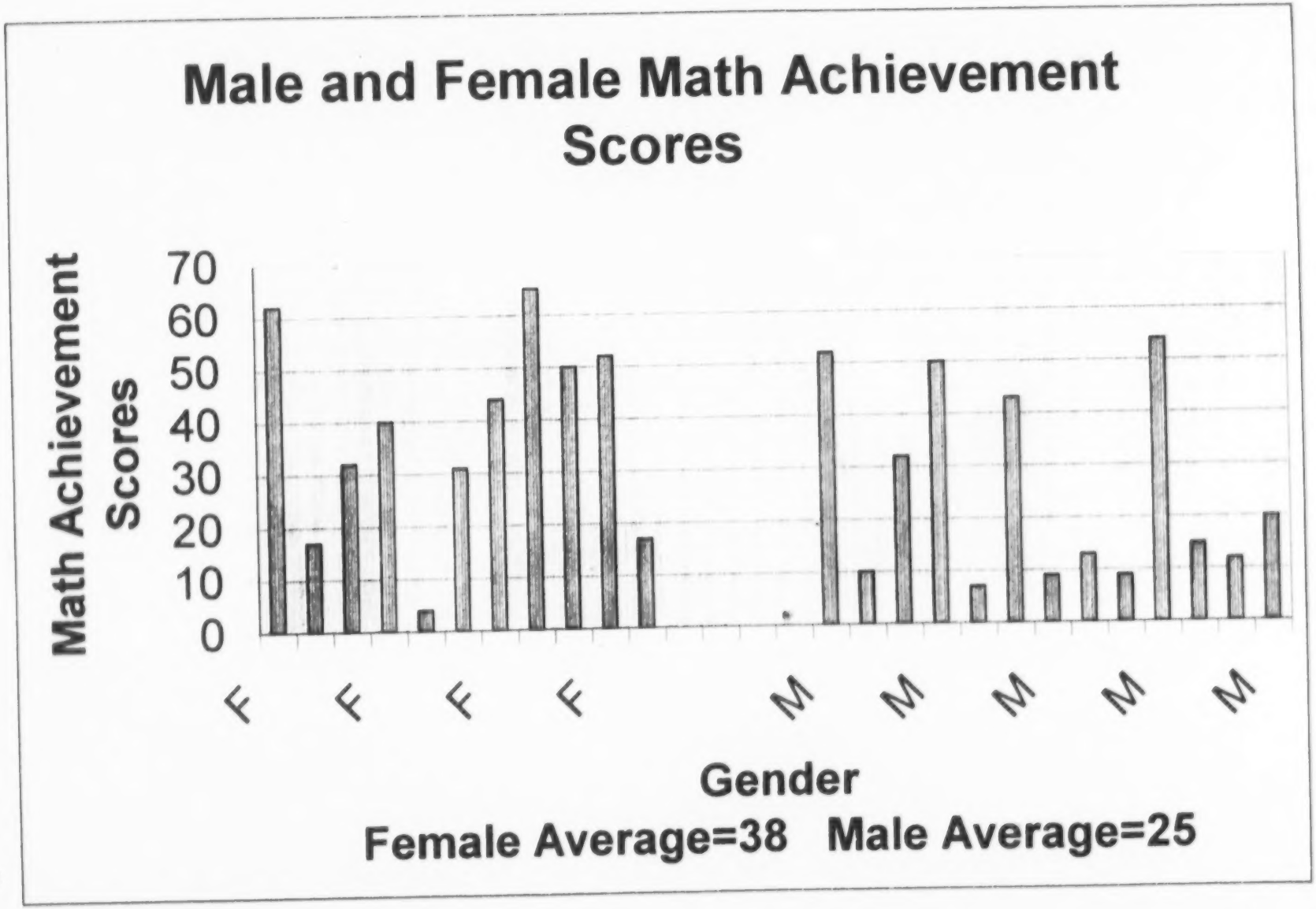
Younger Students	Entry Age	Gender	Reading	Math
1	56	M	29	33
2	56	M	11	10
3	57	M	32	32
4	58	M	60	50
5	58	M	65	62
6	58	F	53	17
7	58	M	8	7
8	59	M	35	53
			Average Readg=37	**Average Math=33**
Medial Group				
9	60	M	39	9
10	60	F	42	32
11	61	M	70	13
12	61	F	64	40
13	61	M	47	9
14	61	F	56	4
15	62	F	30	31
16	62	M	36	54
			Average Readg=48	**Average Math=24**
Older Students				
17	64	F	68	44
18	64	F	67	65
19	65	F	33	15
20	65	M	67	17
21	66	M	41	12
22	66	F	46	50
23	67	M	14	20
24	67	F	76	52
			Average Readg=51	**Average Math=24**
			Standard deviation = 20.74	**Standard deviation = 18.65**

4A


Entry Age and Reading Achievement Scores
Reading Achievement Scores
80
70
60
50
40
30
20
10
0
55
60
65
70
Entry Age
Correlation=.2753


Entry Age and Math Achievement
Math Achievement Scores
70
60
50
40
30
20
10
0
55
60
65
70
Entry age
Correlation=.1071


Male and Female Reading Achievement Scores
Reading Achievement Scores
80
60
40
20
0
F F F F F F
M M M M M M M
Gender
Female Average=53
Male Average=35


Male and Female Math Achievement Scores
Math Achievement Scores
70
60
50
40
30
20
10
0
F
F
F
F
M
M
M
M
M
Gender
Female Average=38 Male Average=25

Conclusion

The sample was small, but the author found overall support that differences between entry ages and academic performance were not significant as determined by the low correlation. The study was limited by the lack of control for ability or the use of another standardized test to study academic progress. Based on the results of the TerraNova the average reading scores were higher for the medial and older group, but the younger group had a higher math average. These scores provide additional evidence that age is not a factor in achievement.

The author was not able to fulfill the criteria suggested by Crosser (1991), such as using a large enough sample size and having controls for ability. However, the sample was limited to children continuously enrolled in the same school or school district, and retained and special education students were omitted in the study. In the process of selecting subjects, the transient nature of the school population was made evident.

The earliest documentation of differences, diminishing or disappearing, in the review of research by the author was in the second grade (May & Welsh, 1986) so it may be predicted that research at the upper grades would provide stronger support that age-eligible children can perform equally well whether they are younger or older when they enter kindergarten.

The differences in average scores between gender showed a greater difference in achievement in reading than in math, with girls performing better than boys. DeMeis & Stearn (1992) suggest that gender "is a more significant variable" than age, and it should receive more attention when looking at entry age issues.

The question of the optimum entry age to school is difficult to determine, but the use of age is the single most unbiased criterion. Differences in ability, age, experience, maturational level will always be present in a class. "Heterogeneity" is a natural characteristic in kindergarten, therefore curriculum needs to focus on meeting the needs of children with a variety of differences. Kindergarten teachers need to be assured that the wide variability will be reduced naturally in later grades.

Recommendation

There has been a tendency for some educators and school personnel to advise parents to hold back younger age-eligible children. However, given the fact that substantial empirical studies exist that discourage late entry, it is necessary that school personnel be informed. Everyone associated with the school, administrators, teachers, instructional assistants, librarians, office personnel, parent volunteers, and custodians may be approached by parents for advice on placing a younger age eligible child. Office personnel need to inserviced about kindergarten entry age since they are usually the first people to meet with parents enrolling children.

Parent education should be an integral part of enrollment in kindergarten and preschool. The school needs to present this information to parents by providing a kindergarten orientation. Pre-schools need to educate parents so they can make informed decisions about placing their child in school.

It is important for educators, especially kindergarten teachers, to be informed of the natural variability of differences in young children. There should be an inservice especially for kindergarten teachers. They need to be aware and assured that the academic skills of children will eventually even out and they will be able to perform satisfactorily with their classmates. They can then in turn advise parents more responsibly about the variability of academic, maturational and age differences of kindergarten children.

Planning time should be made available to teachers to develop programs that will meet the needs of children with linguistic, cognitive, experiential, and developmental differences. Teachers need to be inserviced on effective developmentally appropriate teaching strategies to meet the goals an increasingly academic curriculum.

A more comprehensive research on kindergarten entry age and achievement needs to be conducted within the school district involving all the schools with teachers conducting research at their own schools. Data from schools can be examined by the district for statistical analysis. The results can then be disseminated to the schools and the public on kindergarten entry and academic achievement in the Anaheim City School District. Research that is local is more comprehensible, convincing, and compelling.

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Appendix A

Second Grade Reading and Math Achievement Scores on the Terra Nova Test

Younger Group

Student	Birthdate	*Entry Age	Gender	Reading	Scr.	Math	Scr.
001	11/25/89	4.7=56	M	36%	29	49%	33
002	11/03/98	4.8=56	M	14%	11	15%	10
003	09/07/89	4.9=57	M	40%	32	47%	32
004	09/03/89	4.10=58	M	75%	60	75%	50
005	08/20/89	4.10=58	M	81%	65	93%	62
006	08/16/89	4.10=58	F	66%	53	25%	17
007	08/14/89	4.10=58	M	1%	8	10%	7
008	08/01/89	4.11=59	M	44%	35	64%	43

Medial Group

009	07/02/89	5.0=60	M	49%	39	13%	9
010	07/01/89	5.0=60	F	53%	42	48%	32
011	05/26/89	5.1=61	M	88%	70	20%	13
012	05/07/89	5.1=61	F	80%	64	59%	40
013	06/19/89	5.1=61	M	59%	47	14%	9
014	06/10/89	5.1=61	F	7%	56	6%	4
015	05/02/89	5.2=62	F	38%	30	46%	31
016	04/19/89	5.2=62	M	45%	36	80%	54

Older Group

017	03/02/89	5.4=64	F	85%	68	65%	44
018	03/02/89	5.5=64	F	84%	67	97%	65
019	02/02/89	5.5=65	F	84%	33	25%	15
020	01/21/89	5.5=65	M	41%	67	22%	17
021	12/30/88	5.6=66	M	51%	41	18%	12
022	12/29/88	5.6=66	F	58%	46	75%	50
023	12/15/88	5.6=67	M	18%	14	30%	20
024	12/05/88	5.7=67	F	95%	76	78%	52

*Kindergarten entry age is based on entry date of July 6, 1994